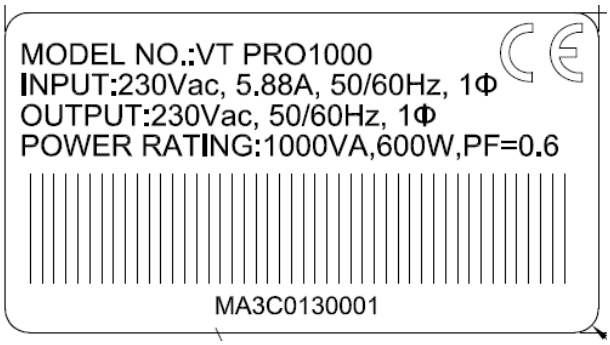
TEST REPORT

EN / IEC 62040-1

Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS

Report reference No . ..... :	U12005-11
Tested by (printed name and signature) ..... :	see cover page .....
Approved by (printed name and signature) ..... :	see cover page .....
Date of issue ..... :	April 11, 2011
Total number of pages .....:	36 pages
Testing Laboratory Name ..... :	A Plus Safety Consulting Co. Ltd.
Address ..... :	7F, No. 163, Sec. 2, Tatung Rd., Shijr City 221, Taipei Hsien, Taiwan, R.O.C.
Applicant's Name ..... :	Ablerex Electronics Co., Ltd.
Address ..... :	1F, No.3, Lane 7, Paokao Rd., Hsintien 23114, Taipei Hsien, Taiwan
Test specification	
Standard..... :	EN 62040-1: 2008, IEC 62040-1: 2008 (1st Edition)
Test procedure ..... :	Service of CE Marking in LVD
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62040_1A
TRF originator . ..... :	TÜV Rheinland Japan Ltd.
Master TRF ..... :	Dated 2009-11
Test item description ..... :	Uninterruptible Power Supply
Trademark ..... :	Ablerex
Manufacturer ..... :	Ablerex Electronics (Suzhou) Co., Ltd. No.36, Wang Wu Road, Suzhou China.
Model and/or type reference ..... :	VT PRO1000, A03-S1001, VT PRO1500, Micro VT1500,A03-S1501, Guard_S 1000A, Guard_S 1000AP, ME1000, MO1000, ALL9100, Nemo 160, Nemo 200, Onda 10, Guard_S 1500A, Guard_S 1500AP, ME1500, MO1500, ALL9150, Onda 16, ABL · LB1000, ABL · LB1500.
Serial number ..... :	N/A
Rating(s) ..... :	Models VT PRO1000, series : I/P: 230 V ac, 5.88 A, 50/60 Hz, 1Φ O/P: 230 V ac, 1000 VA, 600 W, 50/60 Hz, 1Φ Models VT PRO1500, series: I/P: 230 V ac, 8.82 A, 50/60 Hz, 1Φ O/P: 230 V ac, 1500 VA, 900 W, 50/60 Hz, 1Φ

Copy of marking plate



differences label:

	MODEL NO.	VT PRO1000,A03-S1001 Onda 10,Nemo 160 Guard_S 1000A,Guard_S 1000AP ME1000,MO1000,ALL9100 ABL · LB1000	VT PRO1500,A03-S1501 Onda 16,Nemo 200 Guard_S 1500A,Guard_S 1500AP ME1500,MO1500,ALL9150 ABL · LB1500
AC INPUT	230V	230Vac,5.88A,50/60Hz,1Φ	230Vac,8.82A,50/60Hz,1Φ
AC FUSE		8A/250Vac	10A/250Vac
POWER RATING	VA W	1000 600	1500 900

Summary of testing:

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The tested samples were pre-production models without the serial numbers.

Particulars: test item vs. test requirements	
Equipment mobility .....:	Pluggable type A (Detachable power supply cord)
Operating condition.....:	continuous
Mains supply tolerance (%).....:	+ 10%, -10%
Tested for IT power systems .....:	No, TN system
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	Class I
Mass of equipment (kg) .....:	<18 kg
Protection against ingress of water .....:	IP20
Test case verdicts	
Test case does not apply to the test object .:	N/A
Test item does meet the requirement .....:	P(ass)
Test item does not meet the requirement ...:	F(ail)
Testing	
Date of receipt of test item .....:	March 8, 2011
Date(s) of performance of test .....:	March 8, 2011 to April 8, 2011

General remarks

The test result presented in this report relate only to the object(s) tested.
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”(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Standard IEC 62040-1:2008 is to be used in conjunction with IEC 60950-1:2006, which is referred to in this TRF by "RD".

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
4	GENERAL CONDITIONS FOR TESTS		
4.5	Components		P
1.5.1/RD	General		P
	Comply with IEC 60950-1 or relevant component standard	(see appended table 4.3)	P
1.5.2/RD	Evaluation and testing of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.3/RD	Thermal controls		N
1.5.4/RD	Transformers	Transformers used are suitable for their Intended application and comply with the Relevant requirements of the standard and Particularly Annex C.	P
1.5.5/RD	Interconnecting cables	The Interconnection cable contain only SELV	P
1.5.6/RD	Capacitors in primary circuits .....:	X2 capacitor according to IEC 60384-14:1993 with 21 days damp heat test.	P
1.5.7/RD	Resistors bridging insulation		N
1.5.7.1/RD	Resistors bridging functional, basic or supplementary insulation		N
1.5.7.2/RD	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N
1.5.7.3/RD	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N
1.5.8/RD	Components in equipment for IT power systems	TN power system	N
4.6	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system	P
1.6.2/RD	Input current	(see appended table 4.4)	P

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Clause	Requirement – Test	Result – Remark	Verdict
4.4 1.6.4/RD	Neutral conductor	Neutral is not identified in the equipment. Basic insulation for rated voltage between Earthed parts and primary phases. Input neutral is directly connected to the O/p neutral. The unit maintains the TN-System in the standby mode	N

4.7	Marking and instructions		P
4.7.1	General		P
4.7.2	Power rating	See Label	P
	Input rated voltage/range (V).....:	Ditto	P
	Input rated current/range (A).....:	Ditto	P
	Input symbol for nature of supply (d.c.) .....:	The Equipment is for AC Supply	P
	Input rated frequency/range (Hz).....:	Ditto	P
1.7.1/RD	Number of Input phases and neutral……		P
	Output rated voltage/range (V) .....:	Ditto	P
	Output rated current/range (A) .....:	--	N
	Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current)……	Ditto	P
1.7.1/RD	Number of output neutral.....:	Ditto	P
	Output rated active power (W) .....:	Ditto	P
	Output rated apparent power (VA) .....:	Ditto	P
	Output symbol for nature of supply (d.c.) .....:	No d.c output	P
	Rated frequency or rated frequency range (Hz):	Ditto	P
	Max. ambient operating temperature range (°C) .....:	Optional, *0-40*°C mentioned in the user manual.	P
	Manufacturer name or trademark or identification mark .....:	Ablerex	P
	Type/model type reference.....:	See Label	P
	Symbol for Class II equipment only .....:	Class I equipment	N
	Other symbols .....:		N
	Certification marks .....:		N

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Clause	Requirement – Test	Result – Remark	Verdict
	Instructions for units with automatic bypass/maintenance bypass, additional input a.c. supply, or external batteries, having text "See installation instructions before connecting to the supply" .....:		N
4.7.3	Safety instructions	The user manual contains information for operation, installation, servicing, transport, storage and technical data.	P
4.7.3.1	General		P
4.7.3.2	Installation……...:		P
	Location in a restricted access location only.. :		N
	Permanent connector UPS .....:		N
	Pluggable type A or Pluggable type B UPS .. :		P
4.7.3.3	Operation..... :		P
4.7.3.4	Maintenance..... :		P
4.7.3.5	Distribution related backfeed..... :		N
4.7.4	Main voltage adjustment ……..:		N
1.7.4/RD	Supply voltage adjustment ..... :	No adjustment necessary.	N
	Methods and means of adjustment; reference to installation instructions .....:		N
4.7.5 1.7.5/RD	Power outlets.....:		N
4.7.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) ..... :		P
4.7.7 1.7.7/RD	Wiring terminals		P
1.7.7.1/RD	Protective earthing and bonding terminals ..... :	The symbol of ⏚ was marked on the terminal block for connection of protective earthing conductor.	P
1.7.7.2/RD	Terminal for a.c. mains supply conductors ..... :	The marking and indication of the AC mains supply neutral conductor on junction box cover are located that indication of function is clearly.	N
1.7.7.3/RD	Terminals for d.c. mains supply conductors .... :	Only one supply from mains.	N
4.7.8	Battery terminals ..... :	Polarity of battery terminals is indicated according to IEC 60417, Nos. 5005 and 5006 (+ and -) on the battery.	P
4.7.9 1.7.8/RD	Controls and indicators		P

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Clause	Requirement – Test	Result – Remark	Verdict
1.7.8.1/RD	Identification, location and marking .....:	See below.	N
1.7.8.2/RD	Colours .....:	No safety involved controls or indicators.	N
1.7.8.3/RD	Symbols according to IEC 60417 .....:	Functional power switch marked according to IEC 60417, No. 5009 (line half inside circle).	P
1.7.8.4/RD	Markings using figures .....:	Ditto.	N
4.7.10 1.7.9/RD	Isolation of multiple power sources .....:	The markings of the functional power switch are on the switch.	P
4.7.11	IT power systems		N
1.7.10/RD	IT power distribution systems	Equipment was not applied for IT power system.	N
4.7.12	Protection in building installations	Not relied on building installation.	N
4.7.13 5.1/RD	High leakage current (mA) .....:	Leakage current does not exceed 3.5mA	P
4.7.14 1.7.10/RD	Thermostats and other regulating devices	Not provided with thermostats and regulating devices.	N
4.7.15 1.7.2.1/RD 1.7.8.1/RD	Language(s) .....:	Safety instructions and markings were in English language. Other languages will be provided when submitted for national approval.	—
4.7.16 1.7.11/RD	Durability of markings	The label and markings were subjected to the permanence of marking test. The label and marking were rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking on the label and silk printing did not fade. There was no curling nor lifting of the label edge.	P
4.7.17 1.7.12/RD	Removable parts	No required markings placed on removable parts.	N

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Clause	Requirement – Test	Result – Remark	Verdict
4.5.18 1.7.13/RD	Replaceable batteries	The statement was described in the user manual: Caution – Risk Of Explosion If Battery Is replaced By an Incorrect Type. Dispose Of Used Batteries According To The Instructions.	
	Language(s) .....:	English	—
4.7.19 1.7.2.5/RD	Operator access with a tool.....:	A symbol ⚠ was marked in the battery compartment where was visible easily.	P
4.7.20	Battery	Batteries located in battery compartment inside UPS. A label with the information below is located close to the battery compartments.	P
	Clearly legible information .....:		P
	Battery type .....:	Lead acid	P
	Nominal voltage of total battery (V) .....:		P
	Nominal capacity of total battery (optional) .....:		P
	Warning label .....:	CAUTION: the lead acid battery may cause chemical hazard. CAUTION: the battery presents a risk of energy hazard. Maintenance free battery. CAUTION: For disposal instructions for the battery, see users manual.	P
	Instructions .....:	Sufficient information provided in the users manual regarding the battery replacement.	P
2.1.1.5/RD	Protection against energy hazards		P
4.5.21 1.7.2.4/RD	Installation instructions	UPS will be delivered with installed batteries.	P

5	FUNDAMENTAL DESIGN REQUIREMENTS		P
5.1	Protection against electric shock and energy hazards		P
5.1.1 2.1.1/RD	Protection for UPS intended to be used in operator access areas		P
	Test by inspection ..... :		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Test with test finger (Figure 2A) ..... :		P
	Test with test pin (Figure 2B) ..... :		P
	Test with test probe (Figure 2C) ..... :		P
2.1.1.2/RD	Battery compartments .....:		N
2.1.1.3/RD	Access to ELV wiring	No ELV wiring in operator accessible area.	N
	Working voltage (Vpeak or Vrms); minimum distance through insulation (mm)		—
2.1.1.4/RD	Access to hazardous voltage circuit wiring	See below	P
2.1.1.5/RD	Energy hazards .....:	No access with test finger to any parts with only basic insulation to ELV or hazardous voltage. The test pin can not touch hazardous voltage through any openings or seams within the appliance.	P
2.1.1.6/RD	Manual controls	see appended table 5.1.3	P
2.1.1.7/RD	Discharge of capacitors in equipment	No risk of electrical shock.	P
	Measured voltage (V); time-constant (s)..... :	<1 sec	P
2.1.1.8/RD	Energy hazards – d.c. mains supply		P
	a) Capacitor connected to the d.c. mains supply …… ……...	<20J	P
	b) Internal battery connected to the d.c. mains supply ..... :		N
2.1.1.9/RD	Audio amplifiers ..... :		N
5.1.2	Protection for UPS intended to be used in service access areas		P
	Hazardous energy level		—
5.1.3	Protection for UPS intended to be used in restricted access areas		N
	Hazardous energy level		—
5.1.4	Backfeed protection		—
	Shock hazard after de-energization of a.c. input for UPS……..		P
	Measured voltage (V); time-constant (s).....	<1V,1Sec	P

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Clause	Requirement – Test	Result – Remark	Verdict
	Description of the construction .....:	The input is disconnected in line and neutral from the output in backup made and separated with a gap of =1.4mm from one input (L/N) pin to the other input (L/N) pin. The detection circuit are connected before the backfeed relay. However these circuits were isolated by photo couplers to secondary control circuits. No hazardous voltage in backup mode at user accessible wiring connection of terminal block.	P
5.1.5	Emergency switching device		N

5.2	Requirements for auxiliary circuits		P
5.2.1 2.2/RD	Safety extra low voltage circuit - SELV		N
2.2.1/RD	General requirements		N
2.2.2/RD	Voltages under normal conditions (V) ..... :		N
2.2.3RD	Voltages under fault conditions (V) ..... :		N
2.2.4/RD	Connection of SELV circuits to other circuits .. :		N
5.2.2 2.3/RD	Telephone network voltage circuits - TNV	*No TNV circuit.*	N
2.3.1/RD	Limits		N
	Type of TNV circuits.....:		—
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N
2.3.2.4/RD	Protection by other constructions .... :		N
2.3.3/RD	Separation from hazardous voltages		P
	Insulation employed .... :		—

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Clause	Requirement – Test	Result – Remark	Verdict
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed .... :		—
2.3.5/RD	Test for operating voltages generated externally		N
	Test with test probe (Figure 2C) ..... :		—
5.2.3 2.4/RD	Limited current circuits		N
2.4.1/RD	General requirements		N
2.4.2/RD	Limit values		N
	Frequency (Hz) ..... :		—
	Measured current (mA) ..... :		—
	Measured voltage (V) ..... :		—
	Measured capacitance (µF) ..... :		—
2.4.3/RD	Connection of limited current circuits to other circuits		N
5.2.4 3.5/RD	External signaling circuits		N
3.5.1/RD	General requirements		P
3.5.2/RD	Types of interconnection circuits ..... :		P
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment		N
5.2.5 2.5/RD	Limited power source		N
	a) Inherently limited output		N
	b) Impedance limited output		N
	c) Regulating network limited output under normal operating and single fault condition		N
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A),max. apparent power(VA) ……..... :		—
	Current rating of overcurrent protective device (A)……		—

5.3	Protective earthing and bonding		P
5.3.1	General		—
2.6.1/RD	Protective earthing		P
2.6.2/RD	Functional earthing		P
2.6.3/RD	Protective earthing and protective bonding conductors		P
2.6.3.1/RD	General		P

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Clause	Requirement – Test	Result – Remark	Verdict
2.6.3.2/RD	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm^2), AWG:		—
2.6.3.3/RD	Size of protective bonding conductors		P
	Rated current (A), cross-sectional area (mm^2), AWG:		—
	Protective current rating (A), cross-sectional area (mm2), AWG..... ..... :		—
2.6.3.4/RD	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min) ..... :	Resistance, < 0.1Ω Test current: 18A	P
2.6.5/RD	Integrity of protective earthing	It is not possible to disconnect earth without disconnecting mains as terminal block is used.	P
2.6.5.1/RD	Interconnection of equipment		N
2.6.5.2/RD	Components in protective earthing conductors and protective bonding conductors		N
2.6.5.3/RD	Disconnection of protective earth	It is not necessary to disconnect earthing except for the removing of the earthed parts itself	N
2.6.5.4/RD	Parts that can be removed by an operator		N
2.6.5.5/RD	Parts removed during servicing		N
2.6.5.6/RD	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.6.5.7/RD	Screws for protective bonding		N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
5.3.2 2.6.1/RD	Protective earthing		P
2.10/RD	Clearances, creepage distances and distances through insulation		P
4.2/RD	Mechanical strength		N
5.2/RD	Electric strength		P
5.3.3	Protective bonding		N
5.4	AC and d.c. power isolation		P
5.4.1	General		—
3.4/RD	Disconnection from the mains supply		P
3.4.1/RD	General requirement		P
3.4.2/RD	Disconnect devices		P
3.4.3/RD	Permanently connected equipment		N
3.4.4/RD	Parts which remain energized		P

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Clause	Requirement – Test	Result – Remark	Verdict
3.4.5/RD	Switches in flexible cords		P
3.4.6/RD	Number of poles - single-phase and d.c. equipment		P
3.4.7/RD	Number of poles - three-phase equipment		N
3.4.8/RD	Switches as disconnect devices		P
3.8.9/RD	Plugs as disconnect devices		P
3.4.10/RD	Interconnected equipment		N
3.4.11/RD	Multiple power sources		N
5.4.2	Disconnect devices		N

5.5	Overcurrent and earth fault protection		P
5.5.1	General		—
2.7.3/RD	Short-circuit backup protection		P
2.7.4/RD	Number and location of protective devices .....:	Overcurrent protection by one or two circuit breaker in the rear of enclosure.	P
2.7.5/RD	Protection by several devices	One or two circuit breakers.	N
2.7.6/RD	Warning to service personnel.....:	Hazardous voltage may be still present in the equipment after the circuit breaker opened. So that the below wording is required as suitable: Caution – Double Pole/Neutral Fusing.	P
5.5.2	Basic requirements	Equipment relies on circuit breaker of the wall outlet installation protection of the building installation in regard to L to N short circuit. Overcurrent protection is provided by the circuit breaker.	P
5.5.3	Battery circuit protection		P
5.5.3.1	Overcurrent and earth fault protection		P
5.5.3.2	Location of protective device	The fuse is directly located behind the supply wire from the battery.	P
5.5.3.3	Rating of protective device		P
5.3.1/RD	Protection against overload and abnormal operation	(see appended table 8.3)	P

5.6	Protection of personnel – Safety interlocks		N
5.6.1	Operator protection		N

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Clause	Requirement – Test	Result – Remark	Verdict
2.8/RD	Safety interlocks		N
2.8.1/RD	General principles		N
2.8.2/RD	Protection requirements		N
2.8.3/RD	Inadvertent reactivation		N
2.8.4/RD	Fail-safe operation		N
2.8.5/RD	Moving parts		N
2.8.6/RD	Overriding		N
2.8.7/RD	Switches and relays		N
2.8.7.1/RD	Contact gaps (mm) .....:		N
2.8.7.2/RD	Overload test		N
2.8.7.3/RD	Endurance test		N
2.8.7.4/RD	Electric strength test	(see appended table 5.8)	N
2.8.8/RD	Mechanical actuators		N
5.6.2	Service person protection		N
5.6.2.1	Covers		N
5.6.2.2	Location and guarding of parts		N
5.6.2.3	Parts on doors		N
5.6.2.4	Component access		N
2.8.3/RD	Inadvertent reactivation		N
5.6.2.6	Moving parts		N
5.6.2.7	Capacitor banks		N
5.6.2.8	Internal batteries		N

5.7 2.10/RD	Clearances, creepage distances and distances through insulation		P
2.10.1/RD	General		P
2.10.1.1/RD	Frequency		N
2.10.1.2/RD	Pollution degrees ..... :	Pollution degrees 3	P
2.10.1.3/RD	Reduced values for functional insulation		N
2.10.1.4/RD	Intervening unconnected conductive parts		P
2.10.1.5/RD	Insulation with varying dimensions		N
2.10.1.6/RD	Special separation requirements		N
2.10.1.7/RD	Insulation in circuits generating starting pulses		N
2.10.2/RD	Determination of working voltage	<325Vp	P
2.10.2.1/RD	General		—
2.10.2.2/RD	RMS working voltage	230V	P
2.10.2.3/RD	Peak working voltage	<325V	P
2.10.3/RD	Clearances	See below	P

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Clause	Requirement – Test	Result – Remark	Verdict
2.10.3.1/RD	General		P
2.10.3.2/RD	Mains transient voltages		—
	a) AC mains supply ..... :		—
	b) Earthed d.c. mains supplies ..... :		—
	c) Unearthed d.c. mains supplies ..... :		—
	d) Battery operation ..... :		—
2.10.3.3/RD	Clearances in primary circuits	(see appended table 5.8)	P
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.8)	P
2.10.3.5/RD	Clearances in circuits having starting pulses		N
2.10.3.6/RD	Transients from a.c. mains supply ..... :		—
2.10.3.7/RD	Transients from d.c. mains supply ..... :		—
2.10.3.8/RD	Transients from telecommunication networks and cable distribution systems ..... :		N
2.10.3.9/RD	Measurement of transient voltage levels		P
	a) Transients from a mains supply		—
	For an a.c. mains supply ..... :		—
	For a d.c. mains supply ..... :		—
	b) Transients from a telecommunication network		—
2.10.4/RD	Creepage distances	(see appended table 5.8)	P
2.10.4.1/RD	General		N
2.10.4.2/RD	Material group and comparative tracking index	Ⅲ b	p
	CTI tests .....:		—
2.10.4.3/RD	Minimum creepage distances		
2.10.5/RD	Solid insulation	See below.	P
2.10.5.1/RD	Minimum creepage distances	see appended table 5.1.2	P
2.10.5.2/RD	Distance through insulation		P
2.10.5.3/RD	Insulating compound as solid insulation		N
2.10.5.4/RD	Semiconductor devices		N
2.10.5.5/RD	Cemented joints		N
2.10.5.6/RD	Thin sheet material – General		N
2.10.5.7/RD	Separable thin sheet material		N
	Number of layers (pcs) ..... :		—
2.10.5.8/RD	Non-separable thin sheet material		N
2.10.5.9/RD	Thin sheet material- standard test procedure Electric strength test	The thin sheet materials of polyester tape used in inverter transformer.	P
2.10.5.10/RD	Thin sheet material – alternative test procedure strength test		—

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Clause	Requirement – Test	Result – Remark	Verdict
2.10.5.11/RD	Insulation in wound components		N
2.5.10.12/RD	Wire in wound components		N
	Working voltage ..... :		—
	a) Basic insulation not under stress ..... :		—
	b) Basic, supplementary, reinforced insulation:		—
	c) Compliance with Annex U ..... :		—
	Two wires in contact inside wound component; angle between 45° and 90° :		N
2.10.5.13/RD	Wire with solvent-based enamel in wound components		N
	Electric strength test		N
	Routine test		N
2.10.5.14/RD	Additional insulation in wound components		N
	Working voltage ..... :		N
	- Basic insulation not under stress ..... :		N
	- Supplementary, reinforced insulation ..... :		N
2.10.6/RD	Construction printed boards	No special coating in order to reduce distances.	N
2.10.6.1/RD	Uncoated printed boards		N
2.10.6.2/RD	Coated printed boards		N
2.10.6.3/RD	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4/RD	Insulation between conductors on different layers of a printed board		N
2.10.7/RD	Component external terminations	(see appended table 5.9 and 9)	P
2.10.8/RD	Tests on coated printed boards and coated components		N
2.10.8.1/RD	Sample preparation and preliminary inspection		N
2.10.8.2/RD	Thermal conditioning		N
2.10.8.3/RD	Electric strength test		N
2.10.8.4/RD	Abrasion resistance test		N
2.10.9/RD	Thermal cycling		N
2.10.10/RD	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11/RD	Tests for semiconductor devices and cemented joints		N
2.10.12/RD	Enclosed and sealed parts		N

6	WIRING, CONNECTIONS AND SUPPLY		P
6.1	General		P
6.1.1	Introduction		P

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
3.1/RD	General		P
3.1.1/RD	Current rating and overcurrent protection	All internal wires are UL recognized wiring that is PVC insulated, rated VW-1, min. 105°C, 300V. Internal wiring gauge is suitable for current intended to be carried.	P
3.1.2/RD	Protection against mechanical damage	Wires do not touch sharp edges and heatsinks which could damage the insulation and cause hazard.	P
3.1.3/RD	Securing of internal wiring	Internal wires with only basic isolation are routed so that they are not close to any live bare components. The wires are secured by solder pins and quick-connect terminals or solder and glue so that a loosening of the terminal connection is unlikely.	P
3.1.4/RD	Insulation of conductors	The insulation of the individual conductors are suitable for the application and the working voltage. For the insulation material see 3.1.1. (see appended table 6)	P
3.1.5/RD	Beads and ceramic insulators	Not used.	N
3.1.6/RD	Screws for electrical contact pressure	Electrical connections screwed two or more complete threads into metal. No screws of insulating material for electrical connections, or where supplementary or reinforced insulation could be impaired by a metal replacement.	P
3.1.7/RD	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal.	P
3.1.8/RD	Self-tapping and spaced thread screws	No self tapping screws are used.	P
3.1.9/RD	Termination of conductors	All conductors are reliable secured.	P
	10 N pull test		P
3.1.10/RD	Sleeving on wiring	All sleeving on wiring which used as supplementary insulation were retained in position reliably.	P

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.1.2	Dimensions and rating of busbars and insulated conductors		P

6.2	Connection to power		P
6.2.1	General provisions for connection to power		P
3.2.2/RD	Multiple supply connections	Only one supply.	P
3.2.3/RD	Permanently connected equipment		N
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4/RD	Appliance inlets	The appliance inlet is complies with IEC 60320.	P
3.2.5/RD	Power supply cords		P
3.2.5.1/RD	AC power supply cords		P
	Type.....		—
	Rated current (A), cross-sectional area (mm^2), AWG.....		—
3.2.5.2/RD	DC power supply cords		N
3.2.6/RD	Cord anchorages and strain relief		P
	Mass of equipment (kg), pull (N) ..... …:	100N	P
	Longitudinal displacement (mm) ..... :	< 2.0mm	P
3.2.7/RD	Protection against mechanical damage		N
3.2.8/RD	Cord guards		N
	D (mm); test mass (g) .....:		—
	Radius of curvature of cord (mm).....:		—
6.2.2	Means of connection .....:		P
	More than one supply connection .....:		P

6.3	Wiring terminals for external power conductors		N
3.3/RD	Wiring terminals for connection of external conductors		N
3.3.1/RD	Wiring terminals		N
3.3.2/RD	Connection of non-detachable power supply cords		N
3.3.3/RD	Screw terminals		N
3.3.4/RD	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm^2) .....:		—
3.3.5/RD	Wiring terminal sizes		P
	Rated current (A), type and nominal thread diameter (mm) .....:		—
3.3.6/RD	Wiring terminals design		N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
3.3.7/RD	Grouping of wiring terminals		N
3.3.8/RD	Stranded wire		N

7	PHYSICAL REQUIREMENTS		P
7.1	Enclosure		P
7.2	Stability	The UPS does not overbalance when: (for all types) - titled to an angle of 10˚ when a force of 20% of the UPS weight is used from any direction.	P
4.1/RD	Angle of 10°		P
	Test: force (N) .....:		P

7.3	Mechanical strength		P
4.2.1/RD	General		P
4.2.2/RD	Steady force test, 10 N		P
4.2.3/RD	Steady force test, 30 N	30 N force applied to housing of battery compartment.	P
4.2.4/RD	Steady force test, 250 N	250 N applied to outer enclosure. No energy or other hazards.	P
4.2.5/RD	Impact test		P
	Fall test	500 g steel sphere ball fall from 1.3 m height onto top of enclosure. No safety relevant damages.	P
	Swing test	500 g steel sphere ball as pendulum onto side of enclosure. No safety relevant damages.	P
4.2.6/RD	Drop test		N
4.2.7/RD	Stress relief test	After 7h at 70°C and cooling down to room temperature, no shrinkage, distortion or loosing of front panel was noticeable.	P
4.2.8/RD	Cathode ray tubes	No CRT in the unit.	N
	Picture tube separately certified .....:	(see separate test report or attached certificate)	N
4.2.9/RD	High pressure lamps	No high pressure lamp.	N
4.2.10/RD	Wall or ceiling mounted equipment; force (N) ..:	Not wall or ceiling mounted.	N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
7.4	Construction details		P
7.4.1	Introduction		
4.3.1/RD	Edges and corners	No sharp edge or corner.	N
4.3.2/RD	Handles and manual controls; force (N).....:	No handle or manual control.	N
4.3.3/RD	Adjustable controls	No control.	N
4.3.4/RD	Securing of parts	No connection likely to be exposed to mechanical stress are provided in unit.	P
4.3.5/RD	Connection of plugs and sockets	No plug or socket.	N
4.3.7/RD	Heating elements in earthed equipment	No heating element.	N
4.3.8/RD	Batteries (see also 4.5.20)		P
4.3.11/RD	Containers for liquids or gases	No container for liquid or gas.	N
4.4/RD	Protection against hazardous moving parts		N
4.4.1/RD	General		N
4.4.2/RD	Protection in operator access areas ..... :		P
4.4.3/RD	Protection in restricted access locations ..... :		P
4.4.4/RD	Protection in service access areas		P
4.5/RD	Thermal requirements		P
4.5.1/RD	General		P
4.5.2/RD	Temperature tests		N
	Normal load condition per Annex L .... :		—
4.5.3/RD	Temperature limits for materials		P
4.5.4/RD	Touch temperature limits		P
4.5.5/RD	Resistance to abnormal heat		P
7.4.1	Openings		N
7.4.2	Gas concentration		N
7.4.3	Equipment movement		N

7.5 4.7/RD	Resistance to fire		P
4.7.1/RD	Reducing the risk of ignition and spread of flame	Use of materials with the required flammability classes.	P
	Method 1, selection and application of components wiring and materials	(see appended table 7.5)	P
	Method 2, application of all of simulated fault condition tests	(see appended table 7.5)	P

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.7.2/RD	Conditions for a fire enclosure	Electrical parts are not likely to ignite nearby materials. Parts not protected against overheating under fault conditions.	P
4.7.2.1/RD	Parts requiring a fire enclosure		P
4.7.2.2/RD	Parts not requiring a fire enclosure	Ditto	N
4.7.3/RD	Materials	See below.	P
4.7.3.1/RD	General	PCB rated V-2 or better.	P
4.7.3.2/RD	Materials for fire enclosures	See sub-clause 4.7.2.1.	P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures	See sub-clause 4.7.2.	N
4.7.3.4/RD	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2 or better.	P
4.7.3.5/RD	Materials for air filter assemblies	No air filter.	N
4.7.3.6/RD	Materials used in high-voltage components	No high voltage component.	N

7.6	Battery location	The battery is located inside the UPS.	P
7.6.1	Battery location and installation		N
7.6.2	Accessibility and maintainability		P
7.6.3	Distance	Since the stated ventilation and battery temperature requirements are met, no distance is required.	P
7.6.4	Case Insulation		N
7.6.5	Wiring	The protection of connecting wiring complies with sub-clause6, details see there.	P
7.6.6	Electrolyte spillage	Sealed maintenance free battery, the emission of electrolyte is unlikely.	P
7.6.7	Ventilation	See calculation in Annex M.	P
7.6.8	Charging voltages		P

7.7	Temperature rise	(see appended table 5.1)	P
4.5/RD	Thermal requirements		P
4.5.1/RD	General		P
4.5.2/RD	Temperature tests		N
	Normal load condition per Annex L ..... :		—
4.5.3/RD	Temperature limits for materials		P
4.5.4/RD	Touch temperature limits		P

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.5.5/RD	Resistance to abnormal heat ..... :	(see appended table 7.7)	P

8	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
8.1	General provisions for earth leakage	The leakage current was measured from primary to enclosure.	P
5.1.1/RD	General	(see appended table 8.1)	P
5.1.7/RD	Equipment with touch current exceeding 3.5 A .....:	Leakage current does not exceed 3.5mA	N

8.2	Electric strength		P
5.2.1/RD	General	(see appended table 5.8)	P
5.2.2/RD	Test procedure	(see appended table 5.8)	P

8.3	Abnormal operating and fault conditions		P
8.3.1	General		P
5.3.1/RD	Protection against overload and abnormal operation	- output overload (see appended table 8.3)	P
5.3.2/RD	Motors	No motor used. (see appended Annex B)	N
5.3.3/RD	Transformers	(see appended Annex C)	P
5.3.4/RD	Functional insulation.....	Complies with A) and C).	P
5.3.5/RD	Electromechanical components in	No electromechanical components.	N
5.3.9/RD	Compliance criteria for abnormal operating and fault conditions	See below.	P
8.3.2	Simulation of faults	(See appended table 8.3)	P
8.3.3	Conditions for tests	(See appended table 8.3)	P

9 6/RD	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1/RD	Protection from hazardous voltages	(No TNV Circuit Provided)	N
6.1.2/RD	Separation of the telecommunication network from earth		N
6.1.2.1/RD	Requirements		N
	Test voltage (V) .....:		—
	Current in the test circuit (mA) .....:		—

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.1.2.2/RD	Exclusions .....:		N

6.2/RD	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1/RD	Separation requirements	(No TNV Circuit Provided)	N
6.2.2/RD	Electric strength test procedure		N
6.2.2.1/RD	Impulse test		N
6.2.2.2/RD	Steady-state test		P
6.2.2.3/RD	Compliance criteria	(see appended table 5.8,8.2 and 9)	N

6.3/RD	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A).....:		—
	Current limiting method .....:		—
3.5/RD	Interconnection of equipment		P
3.5.1/RD	General requirenemts		P
3.5.2/RD	Types of interconnection circuits ..... :	Interconnection to other devices by secondary output cable only.	P
3.5.3/RD	ELV circuits as interconnection circuits	No ELV interconnection	N
3.5.4/RD	Data ports for additional equipment		N
2.1.3/RD	Protection in operator access areas	No access with test finger to any parts with only basic insulation to ELV or hazardous voltage. The test pin can not touch hazardous voltage through any openings or seams within the appliance.	P
2.1.3/RD	Protection in restricted access locations	No restrict access location.	N
2.3.1/RD	Limits		N
	Type of TNV circuits .....:		—
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N
2.3.2.4/RD	Protection by other constructions ..... :		N
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed.....:		—
2.3.4/RD	Connection of TNV circuits to other circuits		N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
	Insulation employed.....:		—
2.3.5/RD	Test for operating voltages generated externally		N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
2.10.3.3/RD	Clearances in secondary circuits	(see appended table 5.8)	P
2.10.3.4/RD	Measurement of transient voltage levels	No transient voltage across the clearance lower than due or normal.	N
2.10.4/RD	Creepage distances	(see appended table 5.8)	P
2.10.4.1/RD	General		P
2.10.4.2/RD	Material group and comparative tracking index		—
	CTI tests..... :		—
2.10.4.3/RD	Minimum creepage distances		—

M/RD	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1/RD	Introduction		N
M.2 /RD	Method A		N
M.3/RD	Method B		N
M.3.1/RD	Ringing signal		N
M.3.1.1/RD	Frequency (Hz) .....:		—
M.3.1.2/RD	Voltage (V) .....:		—
M.3.1.3/RD	Cadence; time (s), voltage (V) .....:		—
M.3.1.4/RD	Single fault current (mA).....:		—
M.3.2/RD	Tripping device and monitoring voltage.....:		N
M.3.2.1/RD	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2/RD	Tripping device		N
M.3.2.3/RD	Monitoring voltage (V) .....:		N

A/RD	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		P
A.1/RD	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		P
A.1.1/RD	Samples.....:		—
	Wall thickness (mm).....:		—
A.1.2/RD	Conditioning of samples; temperature (°C) .....:		N
A.1.3/RD	Mounting of samples .....:		N
A.1.4/RD	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D .....:		—

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
A.1.5/RD	Test procedure		—
A.1.6/RD	Compliance criteria		N
	Sample 1 burning time (s) .....:		—
	Sample 2 burning time (s) .....:		—
	Sample 3 burning time (s) .....:		—
A.2/RD	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1/RD	Samples, material.....:		—
	Wall thickness (mm).....:		—
A.2.2/RD	Conditioning of samples		N
A.2.3/RD	Mounting of samples		N
A.2.4/RD	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C .....:		—
A.2.5/RD	Test procedure		N
A.2.6/RD	Compliance criteria		N
	Sample 1 burning time (s) .....:		—
	Sample 2 burning time (s) .....:		—
	Sample 3 burning time (s) .....:		—
A.2.7/RD	Alternative test acc. to IEC 60695-2-2, cl. 4 and 8		N
	Sample 1 burning time (s) .....:		—
	Sample 2 burning time (s) .....:		—
	Sample 3 burning time (s) .....:		—
A.3/RD	Hot flaming oil test (see 4.6.2)		N
A.3.1/RD	Mounting of samples		N
A.3.2/RD	Test procedure		N
A.3.3/RD	Compliance criterion		N

B/RD	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1/RD	General requirements		N
	Position .....:		—
	Manufacturer .....:		—
	Type .....:		—
	Rated values .....:		—
B.2/RD	Test conditions		N
B.3/RD	Maximum temperatures		N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
B.4/RD	Running overload test		N
B.5/RD	Locked-rotor overload test		N
	Test duration (days) ..... :		—
	Electric strength test: test voltage (V) ..... :		—
B.6/RD	Running overload test for d.c. motors in secondary circuits		N
B.6.1/RD	General		N
B.6.2/RD	Test procedure		—
B.6.3/RD	Alternative test procedure		—
B.6.4/RD	Electric strength test; test voltage (V) ..... :		—
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1/RD	Test procedure		N
B.7.2/RD	Alternative test procedure; test time (h) ..... :		N
B.7.3/RD	Electric strength test		N
B.8/RD	Test for motors with capacitors		N
B.9/RD	Test for three-phase motors		N
B.10/RD	Test for series motors		N
	Operating voltage (V) ..... :		—

C/RD	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position ..... :		—
	Manufacturer ..... :		—
	Type ..... :	--	—
	Rated values ..... :	--	—
	Method of protection..... :	--	—
C.1/RD	Overload test	(see appended table 7.5 and 8.3)	P
C.2/RD	Insulation	(see appended table 5.8, 8.2 and 9)	P
	Protection from displacement of windings..... :	Ditto	P

D/RD	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		P
D.1/RD	Measuring instrument	Fig. D.1 used.	P
D.2/RD	Alternative measuring instrument	See annex D.1.	N

E/RD	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13) *Thermocouple method used.*	N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
F/RD	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10/RD and Annex G/RD)		P
G/RD	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES *The alternative method is not considered.*		N
G.1/RD	Clearances		N
G.1.1/RD	General		N
G.1.2/RD	Summary of the procedure for determining minimum clearances		N
G.2/RD	Determination of mains transient voltage (V) :		N
G.2.1/RD	AC mains supply		N
G.2.2/RD	Earthed d.c. mains supplies		N
G.2.3/RD	Unearthed d.c. mains supplies		N
G.2.4/RD	Battery operation		N
G.3/RD	Determination of telecommunication network transient voltage (V)		N
G.4/RD	Determination of required withstand voltage (V) :		N
G.5/RD	Measurement of transient levels (V) :		N
G.6/RD	Determination of minimum clearances :		N
H	ANNEX H, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER AND FOREIGN OBJECTS (see IEC 60529)		N
I	AENN I, Backfeed protection test		P
I.1	General		P
I.2	Test for pluggable UPS		N
I.3	Test for permanently connected UPS		P
I.4	Load-induced change of reference potential		P
I.5	Solid-state backfeed protection(see clause 7.1-7.5 of IEC 62040-2 and clause7.1-7.2 of IEC 62040-3)		N
J/RD	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal used .....:		—
K/RD	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)		N
K.1/RD	Making and breaking capacity	No thermal control.	N
K.2 /RD	Thermostat reliability; operating voltage (V) .....:		N
K.3/RD	Thermostat endurance test; operating voltage (V) .....:		N
K.4/RD	Temperature limiter endurance; operating voltage (V) .....:		N

EN / IEC 62040-1			
Clause	Requirement – Test	Result – Remark	Verdict
K.5/RD	Thermal cut-out reliability		N
K.6/RD	Stability of operation	(see appended table 7.5 and 8.3)	N

L	ANNEX L, REFERENCE LOADS		P
L.1	General		P
L.2	Reference resistive load	Measured output voltage from online and battery back-up mode is complied with the tolerance specified by manufacturer.	P
L.3	Reference inductive-resistive load		N
L.4	Reference capacitive-resistive loads	Measured output voltage from online and battery back-up mode is complied with the tolerance specified by manufacturer.	P
L.5	Reference non-linear load		N
L.5.1	Test method		N
L.5.2	Connection of the non-linear reference load		N

M	ANNEX M, VENTILATION OF BATTERY COMPARTMENTS		N
M.1	General	N = 2 C = 9.0Ah A>28hxcm²/m³x(0.054m³ /Ah)x2x0.2A/100Ahx9.0Ah A>0.054cm² The size of ventilation openings in UPS enclosures exceeds the required airflow by far.	N
M.2	Hydrogen concentration		N
M.3	Blocked conditions		P
M.4	Overcharge test		P

U/RD	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4/RD)		N
	Separate test report	No triple wire used.	—

V/RD	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1/RD)		N
V.1/RD	Introduction		N
V.2/RD	TN power distribution systems		N

4.3	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Appliance inlet (for 1000/1500 Models)	ZHE JIANG BEI ER JIA ELECTRONIC CO LTD	ST-A01-003K	10A,250Vac	EN 60320-1:2002-06 EN 60320-1:2001 ANSI / UL 498	VDE, TUV, UL
	RICH BAY CO LTD	R-301SN-00			
Appliance outlet (for 1000/1500 VA Models)	SHENZHEN DELIKANG ELECTRONICS TECHNOLOGY CO LTD	CDJ-3-2	10A,250Vac	ANSI / UL 498 EN 60320-2-2 EN 60320-1	UL, VDE, UL
	RICH BAY CO LTD	R-302G3			
Input Fuse (for 1500VA Model)	COOPER	ABC	10A,250V	UL 248-1 UL 248-14	UL
	SUN ELECTRIC CO	**6C**			
Input Fuse (for 1000VA Model)	SUN ELECTRIC CO	**6C**	8A,250V	UL 248-1 UL 248-14	UL
Output Transformer (for 1500 Model)	ABLEREX	160210424000005	130°C	--	Tested with unit
Output Transformer (for 1000VA Model)	ABLEREX	**160210523000003**	130°C	--	Tested with unit
The following components on main PCB for 1500VA/1000VA Models					
PCB	Various	Various	V-0 min., 130°C min.	UL 796	UL
X capacitors (C4,C35)	Cheng Tung Industrial Co., Ltd	CTX	Max. 0.22µF; Min. 300V, Min . 85°C	IEC 60384-14 2 ed., incl. 21 days damp heat Test UL1414	VDE, UL
	Sheng Chang Technology Co.,Ltd	PB			
	Chiefcon Electronics Co., Ltd.	CKX			
	Tenta Electronics Industrial Co., Ltd.	MEX			
Varistors (MOV1)	Brightking Inc.	621KD14	Varistor Voltage 620VACH	UL1449 EN61051-2	UL, VDE
	Success Electronics Co. Ltd.	SVR-14D621K			
	Dongguang Littelfuse Electronics Co. Ltd.	SAS-621KD14			
	Shantou high-new Technology	STE-14D621K			
Relay (K1~K4)	Song Chuan Precision Co., Ltd.	833H-1C-C	7A, 250V	EN61810-1:2004 EN60255-23:1996 EN61810-5:1998	TUV
	HSIN DA PRECISION CO LTD	943-1C-12DS			

Battery Fuse (F1,F2)	LITTELFUSE INC	257030	32Vdc, 30A	UL 275	UL
Backfeed Relay (K5,K6)	XIAMEN HONGFA ELECTROACOUSTIC CO LTD	JZX-140FF/048-2HST	10A/250V	EN61810-1:2004 EN60255-23:1996 EN61810-5:1998	TUV
Isolation Transformer (T4)	CORMEX	190501010001001	130°C	--	Tested with unit
	LIOBN	190501010001001			
	Xepex	190501010001001			
MOSFET (Q17~Q20)	Various	Various	72A,60V	--	--
Optocoupler (U1,U2)	Cosmo	K1010, KPC817	5000V	EN 60950-1	FI, VDE
	Lite-on	LTV-817			
	Vishay	TCET1109			
	Sharp	PC123			
	Everlight	EL817			
Battery (For 1500VA Model)	CSB Battery Co., Ltd.	HR1234WF2 HR1234WFR(V-0) HRL1223WFR(V-0) HRL1234WFR(V-0)	9AH, 12Vdc	UL1989	UL
	Japan Storage Battery Co., Ltd.,	PX12090			
	GS Yuasa International Ltd.	REW45-12FR NPW45-12FR(V-0) REC9-12(V-0)			
	Taiwan Yuasa Battery Co., Ltd.	REW45-12FR NPW45-12FR(V-0) REC9-12(V-0)			
	Toplite (Guangzhou) Technology Battery Co., Ltd.	NPW45-12 NPW45-12FR(V-1) REW45-12FR(V-1)			
	First Power Technology Co. Ltd.	FP1290(V-2)			
	Shenzhen Center Power Technology Co., Ltd.	CP1290, CP1290L			
	B&B Battery (USA) INC.	HR9-12			
	WALTER ELECTRONIC CO LTD	--			
Battery (For 1000VA Model)	CSB Battery Co., Ltd.	GP1272FR(V-0) GPL1272F2FR(V-0) GP1272FR(V-0) GPL1272F2FR(V-0)	7.2AH, 12Vdc	UL 1989	UL
		GP1270	7.0AH, 12Vdc		
	Japan Storage Battery Co., Ltd.	PX12072	7.2AH, 12Vdc		
		PWL12V7(94V-0)	7.0AH, 12Vdc		
	GS Yuasa International Ltd	NP7-12 NP7-12FR(V-0) NP7-12LFR(V-0) RE7-12(V-0) PWL12V7(94V-0)	7.2AH, 12Vdc		
		RE7.5-12FR(V-0)	5AH, 12Vdc		
	Taiwan Yuasa Battery Co., Ltd.	NPW36-12	7.2AH, 12Vdc		

	Toplite (Guangzhou) Technology Battery Co Ltd	NPW36-12 NP7.2-12FR(V-1) NPW36-12FR(V-1) NP7-12FR(V-1)	7.2AH, 12Vdc		
	First Power Technology Co. Ltd.	FP1272(V-2)	7.2AH, 12Vdc		
		FP1270	7.0AH, 12Vdc		
	Shenzhen Center Power Technology Co. Ltd.	CP1272	7.2AH, 12Vdc		
		CP1270L CP1270	7.0AH, 12Vdc		
	B&B Battery (USA) Inc.	BP7.2-12 BP7.2-12FR(V-0) HR1234W HR1234WFR(V-0) BP7-12(HB) BP7-12FR(V-0) BP7.5-12(HB)	7.2AH, 12Vdc		
		BP7.5-12FR(V-0) BPL7.5-12(HR) BPL7.5-12FR(V-0)	7.5AH, 12Vdc		
		BPL7-12(HB) BPL7-12FR(V-0) BPX7-12(HR) BPX7-12FR(V-0) EP7-12(HR) EP7-12FR(V-0) BPS7-12(HR) BPS7-12FR(V-0) SHR7-12(HB) SHR7-12FR(V-0) BC7-12(HB) BC7-12FR(V-0) BPG7-12(HB) BPG7-12FR(V-0)	7.2AH, 12Vdc		
	Panasonic Corporation	UP-RW1245P1 LC-R127R2 LC-RA127R2 LC-P127R2(94V-2) UP-PW1245(94V-0) UP-RW1245 UP-VW1245(94V-0) LC-V127R2(94V-0) LCVA127R2(94V-0)	7.2AH, 12Vdc		
	Shenzhen Sunnyway Battery Tech Co., Ltd	12V7.2AH	7.2AH, 12Vdc		
		12V7.0AH	7.0AH, 12Vdc		

1) an asterisk indicates a mark which assures the agreed level of surveillance

4.4	TABLE: electrical data (in normal conditions)					**P**
fuse #	Irated (A)	U (V)	P (VA)	I (A)	Ifuse (A)	condition/status
For 1500VA model:						
Circuit breaker	--	207V/50Hz	1500	7.5	7.5	Charging of empty batteries and rated output load
Circuit breaker	--	207V/60Hz	1500	7.5	7.5	Ditto
Circuit breaker	5.88	230V/50Hz	1500	6.7	6.7	Ditto
Circuit breaker	5.88	230V/60Hz	1500	6.7	6.7	Ditto
Circuit breaker	--	253V/50Hz	1500	6.1	6.1	Ditto
Circuit breaker	--	253V/60Hz	1500	6.1	6.1	Ditto
For 1000VA model:						
Circuit breaker	--	207V/50Hz	1000	5.1	5.1	Charging of empty batteries and rated output load
Circuit breaker	--	207V/60Hz	1000	5.1	5.1	Ditto
Circuit breaker	8.82	230V/50Hz	1000	4.5	4.5	Ditto
Circuit breaker	8.82	230V/60Hz	1000	4.5	4.5	Ditto
Circuit breaker	--	253V/50Hz	1000	4.2	4.2	Ditto
Circuit breaker	--	253V/60Hz	1000	4.2	4.2	Ditto
supplementary information						

5.1.2	TABLE: distance through insulation measurements			**P**
distance through insulation di at/of:	Up (V)	test voltage (V)	required di (mm)	di (mm)
Photo couplers (reinforced insulation) at signal connector .	325	3000	0.4	approved comp.
Insulation tape between prim. windings and sec. core in transformer (T4) Reinforced: Bobbin	325	3000	0.4 1 layer	0.8 mm 1 layer

5.1.3	TABLE: discharge test			**P**
Condition	τ calculated (s)	τ measured (s)	t u→ 0V (s)	comments
Switch on: L-N	--	510 m	1510 m	Vo= 253V, 37% of Vo= 93.6V, after 1 sec 1.5 V

Overall capacity : C35, C4 Discharge resistor: Discharge through circuit				

5.8 and 9	TABLE: clearance and creepage distance measurements	**P**

clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Primary components (with 10N) to secondary components (with 10N)	<325	230	4.0	4.0	5.0	5.0
Primary traces to earthed traces (PE)	<325	230	2.0	≥2.0	2.5	≥2.5
Primary traces to secondary	<325	230	4.0	≥4.0	5.0	≥5.0
supplementary information						

5.8, 6, 8.2 and 9	TABLE: electric strength tests, impulse tests and voltage surge tests	P

test voltage applied between:	test voltage (V) a.c. / d.c.	breakdown Yes / No
Primary and secondary	DC 4242V	No
Primary and earthing (PE)	DC 2121V	No
supplementary information		

7.5 and 8.3	TABLE: fault condition tests		**P**
	ambient temperature (°C)	25°C	-
	model/type of UPS	--	-
	manufacturer of UPS	--	-
	rated markings of UPS	--	-
5.4.1	Protection against overload, failure or careless use.		
	This UPS incorporates the following protective devices:		
5.4.6	Faults in other components and circuits		

No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
The following test performed on 1500VA model: ***)**							
01	Openings	Blocked	230	7 hours	Circuit breaker	6.5	Unit change from on-line to bypass, T1 coil = 59.8°C Ambient = 24.5°C, no hazards.
02	Output	S-c	230	< 1 sec.	Circuit breaker	0.1	Unit shutdown, buzzer sound is heard, no hazards.
03	Output Transformer (for 1500VA)	o-l	230	3 hours	Circuit breaker	8.5	Fuse opened, Transformer input wire = 88.7°C, output wire = 87.6°C, core = 89.4°C, Ambient = 24.5°C

04	Output Transformer (for 1000VA)	o-l	230	3 hours	Circuit breaker	5.6	Fuse opened, Transformer input wire= 90.7°C, output wire = 91.6°C, core= 92.4°C, Ambient= 24.5°C
05	BD1 (+ ~ -)	S-c	230	< 5 sec	Circuit breaker	0.1	BD1 damaged, Unit shut down, no hazard.
06	Q12, (D-S)	S-c	230	< 1 sec.	Circuit breaker	0.1	Q2 damaged, Unit shut down, AC Fuse opened, no hazards.
07	Q25 (D-S)	S-c	230	< 1 sec.	Circuit breaker	0.1	Q25 damaged, Unit shut down, no hazards.
08	Q23 (D-S)	S-c	230	< 1 sec.	Circuit breaker	0.1	Q23 damaged, Unit shut down, no hazard.
09	Q17, (D-S)	S-c	Back up mode	< 1 sec.	F1, F2	--	Q17 damaged, Unit shut down, F1,F2 opened, no hazards
10	C14	S-c	Back up mode	< 1 sec.	F1, F2	--	Unit shut down, DC fuse (F1, F2) damaged, no hazards.
11	Battery	S-c	Back up mode	< 1 sec.	F1, F2	--	Unit shut down, DC fuse (F1, F2) damaged, no hazards.

Note:

1.***)*** The result also represent to 1000VA model.

2.In fault column, s-c = short-circuited, dis = disconnected, o-l = over-loaded.

5.1	TABLE: temperature rise measurements				**P**
	test voltage (V)	**207V**	**253V**	backup	-
	t1 (°C)	Ditto			-
	t2 (°C)	Ditto			-
temperature rise dT of part/at:		T (°C)			Allowed Tmax(°C)
1500VA model: ***)***					
External plastic enclosure		33.3	33.4	33.4	79.5
Inlet		46.5	46.6	46.5	69.5
Relay coil (K1)		65.7	70.1	53.1	74.5
Relay coil (K2)		68.5	68.1	52.3	74.5
Relay coil (K3)		71.3	71.5	54.6	74.5
Backfeed Relay coil (K4)		77.1	78.5	69.1	94.5
Transformer coil (T4)		42.1	42.2	41.8	94.5 ***(1)*** 126.5 ***(2)***
Transformer coil (T3)		57.5	57.7	50.5	94.5 ***(1)*** 126.5 ***(2)***
X capacitors (C35)		70.3	69.9	61.1.	69.5
Mosfet (Q17)		84.5	83.1	106	114.5
Mosfet (Q20)		82.1	81.8	103	114.5

Output Transformer coil (for 1500VA Model)	65.4	66.5	90.9	94.5 ***(1)*** 126.5 ***(2)***
Output Transformer coil (for 1000VA Model)	68	68.5	90.5	94.5 ***(1)*** 126.5 ***(2)***
Ambient	24.5	25	25.1	-

Comments:

****)*** The result also represent to 1000VA models.

Maximum ambient temperature of 40°C. The maximum temperatures are calculated based upon a (minimum) test temperature of 24.5°C.

Temperature limits include less 10K for thermocouple measurement Temperaure limits include less 10K for thermocouple measurement method.

Temperature are adjusted according to cl. 1.4.12.3/RD. air flow of fan is 1.07CMM.

(1) Max. allowed temperature for 207V and 253V. ***(2)*** Max. allowed temperature for back up mode.

7.7	TABLE B: ball pressure test of thermoplastic parts		**P**
	allowed impression diameter (mm) .....:	≤ 2 m	—

part	test temperature (°C)	impression diameter (mm)
Bobbin of T4	125	0.25

8.1	TABLE: earth leakage current		**P**
Measurement location (Terminal A connected to...)		**$U_{2,rms}$** [V] Polarity switch: **L / N**	**Touch current** [A] = U_2 / 500
To enclosure, & power switch = ON	**"e"** = open !!	--	<1.1ma
To enclosure, & power switch = ON	**"e"** = open !!	On	<1.3ma
Plug (PE) to RS232 pin 1, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 2, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 3, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 4, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 5, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 6, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 7, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 8, & power switch = ON	**"e"** = closed	--	<0.2ma
Plug (PE) to RS232 pin 9, & power switch = ON	**"e"** = closed	--	<0.2ma

Input voltage : 253

Input frequency : 50Hz

Remarks:

Manufacturer site: Ablerex Electronics (Suzhou) Co., Ltd.
No.36, Wang Wu Road, Suzhou China.

1. The instructions specified by the standard have to be in official language of each country, however, only English is checked for this report. It is the applicant responsibility to provide instruction in each official language of the EU.

2. This report is submitted for the exclusive use of the client to whom it is addressed. Its significance is subject to the adequacy and representative character of the sample(s) and to the comprehensiveness of the tests, examinations or surveys made.

3. The CE marking may only be used if all relevant and effective EC directives are complied with.

4. The equipment UPS: Models VT PRO1000, A03-S1001, VT PRO1500, Micro VT1500,A03-S1501, Nemo 200, Guard_S 1000A,Guard_S 1000AP, ME1000, MO1000, ALL9100, Nemo 160, Onda 10, Guard_S 1500A, Guard_S 1500AP, ME1500, MO1500, ALL9150,Onda 16, ABL · LB1000, ABL · LB1500 are covered in the scope of IEC/EN 62040-1. The test samples are pre-production without serial number.

5. The test results are true for the test sample only.